

## I. INTRODUCTION

This is an application for funds to provide partial support for a FASEB Summer Research Conference entitled Gastrointestinal Tract IV: Development and Repair-Cellular and Molecular Aspects. This conference will be the fourth in a series of FASEB Summer Research Conferences on the digestive organs that have been distinguished by a remarkable degree of success as measured by the enthusiastic response of attenders. The meeting will be held at Copper Mountain, Colorado on August 4-9, 1991. The objectives of the conference will be addressed by sessions on nine interdisciplinary subtopics each focused on the advancing front of research in gastrointestinal biology. A special goal of the proposed conference will be to bring investigators who have made major contributions to allied disciplines together with gastroenterological scientists so that the GI workers will be introduced to new approaches that they might not encounter during their usual activity-filled academic and clinical lives. The conference will concentrate on molecular and cellular biological topics, but will extend in scope to the clinical realm. Considerable attention has been devoted to choosing topics of interest both to basic and clinical investigators so that each will want to attend the meeting and derive benefit, not only from the scheduled topics, but from interactions with one another. Effective and meaningful exchanges between basic and clinical scientists has been one of this conference series' most attractive features. Every effort is being made to continue this tradition. Funds are requested to support travel, room and board for invited speakers as well as a small number of selected young investigators and trainees. Commitments to speak have been obtained from many scientists, American and Foreign, who are acknowledged as world leaders in their fields. The conference should thus be lively and of great value not only to the established investigators who attend, but also, for its inclusion of beginning workers, to the future of the field itself.

### A. General Objectives

1. To carry out the intent, agreed upon by vote of the participants at 3 prior FASEB Summer Conferences to hold a gastrointestinal research conference every two years.
2. To focus the 1990 conference on the cellular and molecular aspects of the development and repair of the bowel. The intent will be to include both basic and clinical subjects. The scope will include both phenomena relevant to the mucosa of the gut, and thus the processes of digestion, absorption and secretion, and phenomena relevant to the neuromuscular apparatus of the bowel, and thus motility.
3. Attention will not be directed only to the presentation of the most recent advances in information, concepts and investigative strategies of gastroenterological research. In addition, a new departure will be to bring to the meeting investigators who have worked on other systems, but who have developed concepts or research strategies that are relevant to GI investigation.
4. To integrate information derived from studies carried out at the cellular and molecular levels to provide insight into the interactive and regulatory functions of the effector systems that define the behavior of the whole organ (i.e., the intestine and stomach).
5. To provide an atmosphere for the participants to improve their understanding both of their own field and of related disciplines. Current concepts of development and repair of the mucosa, enteric nervous system, GI musculature, and the immune system will be considered at subcellular, cellular and tissue levels of organization. Relevance of basic information to clinical conditions will be emphasized.

**B. Specific Aims are to Present and Discuss Recent advances in:**

- (1) The renewal of the epithelium of the bowel. Considerable advances have been made in furthering knowledge of renewing cell populations from studies of the hematopoietic system. In this system, as well as in the bowel, a stem cell population is maintained, while progeny of these cells go on to form progenitors of specific cell types and the terminally differentiated cells themselves. An introduction to the topic will thus be provided (Christopher Potten) after which generally applicable principles derived from studies of hematopoietic cells will be considered in depth (Edward Birkenmeier). These principles will then be related to the biology of intestinal stem cells (Christopher Potten) and the cell lineages derived from them (Bruce Ponder).
- (2) Cell- and region-specific regulation of intestinal gene expression. Studies of transgenic mice have provided valuable insight into spatial factors in gene regulation in the intestinal epithelium. These will be discussed (Jeffrey Gordon) as will the expression of specific genes, such as that encoding the elastase enhancer (Ray Mac Donald) and  $\alpha$ -Fetoprotein (Angela Tyner). A planned discussion will relate the consideration of gene expression to the differentiative question addressed in #1 above (Bruce Ponder)
- (3) Models of epithelial differentiation. Understanding of the differentiation of the epithelium has been greatly furthered by the acquisition of antigenic markers which serve as investigational probes. An introduction to the monoclonal or monospecific polyclonal antibodies, which have revolutionized research in this area will be provided (Andrea Quaroni). In addition newly-developed cell lines that serve as models have also been extremely helpful and will be covered. Examples will be drawn from the synthesis and processing of brush border hydrolases (Hans-Peter Hauri), the use of subcloning to study differentiation of intestinal epithelial cells (Daniel Louvard), and the targeting of membrane and secretory proteins in epithelial cell lines (Michael Rindler).
- (4) Development and maintenance of polarized epithelial cell function. Enterocytes are examples of polarized epithelial cells, which have different apical and baso-lateral membrane domains. A great deal about how membrane proteins are targeted to specific domains has been learned from investigations of MDCK cells. This will be reviewed (Michael Caplan) and applied to the gut. The role of the cytoskeleton in establishing and maintaining polarity will be considered (Mark Mooseker). The assembly of tight junctions, which are critical both for the absorptive and barrier functions of the GI epithelium and also for the maintenance of separate membrane domains will also be considered (James Anderson). Finally, the targeting of IgA will be presented and will serve to relate this topic to the next (Keith Mostov).
- (5) Endocytosis and transcytosis in mucosal immunity. A great deal of attention has been paid in prior conferences to the problem of defensive reaction of the bowel wall and its role in the pathogenesis of disease. This topic returns in the proposed conference and will be related to the cellular and molecular themes that characterize this meeting. Concentration will be on the epithelium. Transepithelial transport of antigens (Marion Neutra), antibodies in the developing gut (Richard Rodewald), the production of cytokines by intraepithelial lymphocytes (Jerry McGhee) and the transport and function of secretory IgA (Jean-Pierre Krahenbuhl) will be specific subtopics of presentations;
- (6) Extracellular modulation of gastrointestinal cell differentiation. The GI epithelium does not differentiate alone, but does so in a microenvironment that also contains non-epithelial components that can influence the fate of epithelial progenitors. The role of extracellular components will be considered. First the field will be introduced by discussing the transducing role of integral membrane proteoglycans in matrix-plasma membrane interactions (Merton Bernfield). The ability of integrins to serve as receptors for extracellular matrix components will then be presented (Vito Quaranta). These topics will serve to

introduce a discussion of the role of epithelial-mesenchymal interactions in differentiation of intestinal epithelial cells (Peter Ekblom). Finally, the informational role of extracellular proteoglycans will be considered (Lola Reid).

- (7) Cell migration and repair of the epithelium. The alimentary epithelia can re-seal following limited wounding, a process termed restitution. During restitution terminally differentiated columnar epithelial cells left shouldering a wound rapidly change shape and migrate over the area of denuded matrix to re-establish the epithelial barrier. Currently, however, very little is known concerning how alimentary tract epithelial cells move, how this movement is regulated, and how matrix-epithelial interactions might modulate such movement. Scientific advances derived from non-epithelial tissues thus will be highlighted in order to derive insight into concepts that will aid future research on the lining of the bowel. For example, the discussion will cover how similar problems have been studied in detail in non-intestinal tissues and basic information relating to cell movement and its regulation (crucial issues in restitution). Presentations will include an overview of the problem of restitution and the role of cell motility in this process (James Madara). The fibroblast model will illustrate how non-muscle motile cells move (Lance Taylor); the mechanisms of adherence of moving cells to their substrate over which these cell migrate will be discussed (Mary Beckerle and Mark Sobel).
- (8) The neural crest and gastrointestinal development. Migration is as critical to the development of the nervous system of bowel (ENS) as it is to restitution. The ENS is entirely derived from cells that migrate to the bowel from the neural crest. Specific issues that will be considered relate to the questions of what makes crest-derived cells migrate away from the crest in the first place, what factors determine the pathways followed by these cells, how they find their correct locations in the gut, what makes them stop when they get there, and what factors determine which of the many phenotypes displayed by the population of mature enteric neurons will be expressed by the progeny of particular neural precursors. Subtopics will include the potentiality of crest-derived cell lineages (Nicole Le Douarin), the role played in neural differentiation by the extracellular matrix (Lewis Reichardt), the role played by the extracellular matrix in the migration of crest-derived cells (Marianne Bronner-Fraser), and the role played by the extracellular matrix and cell lineages in the normal and abnormal development of the ENS (Michael D. Gershon).
- (9) Intestinal inflammation/anaphylaxis and neural function. Inflammation and anaphylactic phenomena affect the bowel in many ways. It is now understood that one of these mechanisms involves the intermediation of the ENS. Nevertheless, only in recent years has this interaction between the immune and nervous systems received attention. Focus will thus be directed on this topic, considering as specific subtopics, inflammation-induced intestinal secretion (Don W. Powell), antigen induced (anaphylactic)-induced intestinal secretion (Mary H Perdue), the effect of inflammatory mediators on enteric neurons (Jackie D. Wood), and the general problem of receptor-effector coupling in enteric neurons (Alan North). Each of these subtopics will be accompanied by a prepared discussant, who will bring up the controversial aspects of presentations (Kim E. Barrett, Gilbert A. Castro, Helen J. Cooke, Annmarie Surprenant).

### III. HISTORY OF THE CONFERENCE

Summer research conferences were first sponsored by the Federation of American Societies For Experimental Biology (FASEB) in 1982. These conferences, on a variety of topics, were held throughout the summer in the facilities of the Vermont Academy in Saxton's River, Vermont. The FASEB summer research conferences were modeled after the highly successful Gordon Research Conferences. The initial conferences were very well received by the scientific community and, as a result, have been continued annually at the site in Vermont. In 1986, the high degree of success of the FASEB conferences in Vermont led to the panning and

scheduling of additional summer meetings in Copper Mountain, Colorado. Both sites provide an affordable, informal atmosphere for a small number of participants to interact and exchange scientific information.

The first FASEB summer conference dealing with the gastrointestinal tract was held at the Vermont Academy in July of 1985. This first conference was organized by Drs. Leonard Lichtenberger and Susan Henning and was focused on pre- and postnatal development of the gastrointestinal tract. A second conference was organized by Drs. Leonard Johnson and James Jamieson and was held in Copper Mountain, Colorado in July 1987. This conference addressed growth and adaptation of the gastrointestinal tract from the modern perspectives of cellular and molecular biology and genetics. Participants at the 1987 conference felt that rapid advances in the science of the gastrointestinal tract justified a meeting every two years and voted overwhelmingly to organize the next conference for 1989. The third conference (organized by Dr. Jackie D. Wood and Gilbert Castro) was held at the Copper Mountain site in July of 1989, and was entitled Gastrointestinal Tract III: Cell and Molecular Biology. Tabulation of evaluation questionnaires, from 100 of the 112 participants, indicated that support for the meeting stemmed from a good perception of the choice of subject matter, its scientific content, and its utility in generating new ideas. Also well received were the format of the conference and the atmosphere. Discussions were well perceived but room for improvement was apparent. As a result, a major effort to further discussion has been added to the planning of the forthcoming meeting, in which prepared discussants will be ready to lead off the discussions following formal presentations. Controversies will be aired and attention will deliberately be directed to areas that need additional study.

At the conclusion of the 1989 conference, the attendees elected the following committee to organize the 1990 meeting:

**Chairman:** Michael D. Gershon, M.D., Professor and Chairman  
Department of Anatomy and Cell Biology  
Columbia University, College of Physicians and Surgeons

**Co-Chairman:** Marian Neutra, Ph.D., Associate Professor  
Department of Anatomy and Cell Biology  
Harvard University Medical School

**Committee:**

James Jamieson, M.D., Ph.D., Professor and Chairman  
Department of Cell Biology  
Yale University School of Medicine

Jeffrey Gordon, M.D., Professor  
Department of Medicine, Biochemistry and Molecular Biophysics, Washington University School of Medicine

James L. Madara, M.D., Associate Professor  
Department of Pathology  
Harvard University Medical School

Don W. Powell, M.D., Chief, Division of Digestive Diseases and Nutrition, Professor, Department of Medicine  
University of North Carolina

#### IV. FORMAT OF THE CONFERENCE

The format of the FASEB Summer Research Conference is similar to that of the Gordon Research Conferences and is designed to facilitate the uninhibited exchange of information. In order to encourage investigators to present their work-in-progress at the most advanced level of research, the exchange of information is "off the record". Speakers and poster contributors need not be concerned with publication, which is not permitted. It has been a long standing policy of both the Gordon Research Conference and the FASEB Summer Conferences that the proceedings are not published. As a result, participants need not be concerned that the premature publication of their data will preclude its presentation in finished form or that they will be embarrassed if hunches presented at the conference turn out to be incorrect. The policy of non-publication is deemed necessary to achieve a major objective, which is the free exchange of the latest (and sometimes tentative) information including data, methods and new technology.

The attendance at the conference will be limited to 150 participants. All participants will be provided lodging and meals for 5 days at a nominal cost (\$370). There will be 5 morning (9:00 a.m. - 12:00 noon) and 4 evening (7:30 - 10:00 p.m.) sessions for oral presentations and discussion. Three-4 speakers will be scheduled for each session with 20-30 min allowed for presentation (times will vary according to the plans of individual sessions at the discretion of the Chair) and 10-20 min for discussion. Discussion will be longer in those sessions in which a discussant is prepared to begin the exchanges. Early afternoons will be kept free for informal interactions and recreation. Posters will be invited and will be displayed throughout the conference. Posters will provide a mechanism for active participation by young investigators who will be selected to summarize their data during the sessions. Copies of the abstracts of the posters will be included with the registration materials received by each of the participants.

#### V. ADVERTISEMENT OF THE CONFERENCE

The program of the conference will be published in the December or January issue of The FASEB Journal, Science, and Nature. Announcements for the conference will be submitted to: Gastroenterology, AGA News, American Journal of Physiology, Digestive Diseases and Sciences, Journal of Pediatric Gastroenterology and Nutrition, Gut, Journal of Cell Biology, Cell and Neuron. This will disseminate the information to the broadest cross section of gastrointestinal scientists and allow ample time for the uninvited participants to mail-in their abstracts and application forms to FASEB before the registration deadline in mid-February.

#### VI. SELECTION OF PARTICIPANTS

Selection of the participants will be based on the scientific merit of their research relative to the subtopics of the conference. About 20 places will be reserved for trainees or young investigators just beginning their careers in gastrointestinal research. Funds to defray costs for these young investigators are in the process of being raised from Pharmaceutical companies. Experience has shown that companies are eager to participate and that money for grants to young investigators will be available. Travel grants will be allocated on the basis of the quality of the abstracts would-be participants submit for poster presentation.

An attempt will be made to achieve a reasonable balance among the participants with respect to age, sex and geographic distribution. The invited speakers represent both of distinguished senior scientists and younger investigators. All have achieved international renown for their work and all have agreed to participate. The informal ambience of the FASEB conference (e.g., dining commons, recreational opportunities, only one bar, etc.), together with the seclusion of the site, encourages interactions among all participants.

## VII. JUSTIFICATION

The FASEB Summer Research Conferences on the gastrointestinal tract are different from other meetings on the GI tract, which usually deal with only one component of the bowel or with a single effector system or problem (secretion, absorption, motility, ulcers, and etc). The biannual meetings of the American and International Motility Societies focus primarily on the gastrointestinal musculature and nervous control of GI motility, whereas the European Transport Meetings at 18 month intervals are directed to the biophysics, pharmacological analysis and regulation of mucosal transport functions. Other meetings, which are more general, include the AGA, FASEB, and Neuroscience meetings. In addition, research concerning the alimentary tract is presented at the Cell Biology meeting. These, however, are very large conferences, permit relatively little exchange of ideas, and swamp the research presented at these meeting that is relevant to the bowel in a mass of work on other systems. None of these other conferences are a small meeting that bring together basic scientists and clinicians who are dealing with bowel. The FASEB Summer Conference differs from other meetings in that it spans the whole spectrum from cell and molecular biology to the interactions between effectors that account for the behavior of the gut as an organ. The FASEB Summer Conference thus represents a forum that brings a variety of perspectives together in a format in which scientists with these different perspectives can interact successfully. It will provide a mechanism for exchange of information among different types of investigators working at a wide variety of levels. Most importantly, it will focus on the themes of developmental biology and repair, each of which is of great significance in understanding the pathophysiology of diseases of the GI tract, but which have not been addressed by other conferences.

The conference is also justified by the continuing appeal it has had throughout its history. It is one of the better attended FASEB summer conferences, ranking 6/18 in 1989. It has been continued because a vote of participants each time it has been held have overwhelmingly backed it. The FASEB Summer Conferences are organized each time by a Chair and a committee selected democratically by the investigators who attend. The FASEB GI conferences have also attracted new attendees, while retaining a small core of committed senior scientists who maintain continuity and provide the organizers of each new meeting benefits of experience derived from past conferences. More importantly, the FASEB Summer Conference brings unexpected and different views to GI research. The proposed conference will be exceptional in this regard, because in its organization success has been achieved in attracting commitments from some of the leading scientists in the world in a variety of allied disciplines who will for the first time bring their unique perspectives to bear on the gut. Finally, the FASEB Summer Conferences have a lastingly beneficial affect on the field because they encourage interaction between senior scientists of great eminence and junior investigators at the start of their careers.

## VIII. SCOPE OF THE CONFERENCE

One of the recurring statements on evaluation questionnaires of the previous two FASEB GI Conferences referred to the positive value the respondents placed on the opportunity the Conference provided for them to interact with investigators in other GI research subspecialties, rather than the usual group of scientists talking about the same subjects with whom they usually interact in the pursuit of their own specialty. This mechanism for broadening each investigator's perspective is of enormous benefit. New ideas are generated for research and novel collaborations between scientist who would not otherwise even meet one another begin. Recognition of this benefit helps to account for the interest that continues to be shown in this conference by a multidisciplinary spectrum of investigators who work with the GI tract. Workers in the field have come to recognize that the conferences uniquely accomplish the integration of knowledge at the molecular, cellular and organ levels that generates novelty and new approaches in the formulation of strategies for new experiments. The conference also is unique in that it has been successful in promoting real exchange of idea of mutual benefit between basic scientists and clinicians. To this end it is immeasurably helped by the enthusiastic participation of clinicians who themselves take a cellular and molecular approach to the GI tract and its diseases.

## IX. ACHIEVING THE OBJECTIVES

The objectives will be achieved, in part, by holding formal sessions on selected areas of gastrointestinal research that are relevant to the focus of the conference. In these sessions accomplished investigators present lectures that either give an overview of an emerging field from a unique perspective, or which present new concepts, novel methods, advanced technology or new research directions. Some of the discussion periods will be directed by prepared discussants who will have received advance knowledge of the speaker's intent so that they can be prepared. In some cases controversy will be aired. More often discussants are selected from related areas and will be speakers in other sessions. These discussants will have the job of integrating different sessions and ensuring that the perspective of one field is brought to bear on another. For example Professor Nicole Le Douarin is internationally renowned for her work on the development of the neural crest and the development of the immune systems. She will be asked to discuss sessions on stem cells and epithelial development as well as to present her own novel material. Most sessions are organized with an overview designed to bring the audience up to a level of sophistication adequate to deal with the multiple areas of research all of which are relevant to the themes of development and repair. Poster summaries by young investigators and informal discussions, during group dining, afternoon recesses and evening socializing, will also contribute to achievement of the conference objectives. Contact with each of the lecturers has been made by the organizer/s of the individual sessions. All of the speakers and discussants listed below have agreed to attend and participate in the meeting.

## X. SESSIONS

### Session I. Stem Cells and Development (renewal of epithelium)

#### Christopher Potten Chair

Topic	Speaker	Affiliation
A Brief Overview of the Problem	Christopher Potten	Christie Hospital, Manchester, Great Britain
1. Genetic Approaches to the Study of Stem Cells and Differentiation in a Renewing System: Insights from Hematopoiesis	Edward Birkenmeier	Staff Scientist, Jackson Laboratory, Bar Harbor, Maine
2. The Biology of Intestinal Stem Cells	Christopher Potten	Christie Hospital, Manchester, Great Britain
3. Renewal of the GI Epithelium (Lessons from Lineage Analysis)	Bruce Ponder	Department of Pathology University of Cambridge Tennis Ct. Rd., Cambridge CB21QP
Discussion	Nicole Le Douarin	Professor of the Collège de France and Director of the Institute de L'Embryologie of the Collège de France and of the CNRS, Nogent Sur Marne, France

**Session II. Cell and Region-Specific Regulation of Intestinal Epithelial Gene Expression****Jeffrey Gordon Chair**

Topic	Speaker	Affiliation
A Brief Overview of the Problem	Jeffrey Gordon	Professor of Medicine, Biochemistry and Molecular Biophysics, Washington University School of Medicine, St Louis MO
1. Transgenic Models for Evaluating Spatial Differentiation in the Gut Epithelium	Jeffrey Gordon	see above
2. Functional Domains of the Elastase Enhancer	Ray MacDonald	Professor of Biochemistry, University of Texas Southwestern Medical Ctr. Dallas Texas
3. Alpha Fetoprotein Expression in the Mouse Gastrointestinal Tract	Angela Tyner	Howard Hughes Medical Institute, Lewis Thomas Laboratory, Biology Dept, Princeton University, Princeton, N.J. (after Jan 1991; Dept. Genetics, University of Ill. at Chicago)
Discussion	Bruce Ponder	Department of Pathology University of Cambridge Tennis Ct. Rd., Cambridge C621QP

**Session III. Models of Epithelial Differentiation****Andrea Quaroni Chair**

Topic	Speaker	Affiliation
1. Antigenic Markers for Normal, Neoplastic Proliferative, and Differentiating Intestinal Cells.	Andrea Quaroni	Associate Professor, Department of Physiology, Cornell University Veterinary School, Ithaca, NY
2. Synthesis and Processing of Brush Border Hydrolases (Insights from Caco 2 Cells)	Hans-Peter Hauri	Department of Pharmacology, University of Basel, Biocentre, Basel, Switzerland
3. HT29 subclones as Models for Intestinal Cell Differentiation	Daniel Louvard	Director of Research, Department of Molecular Biology, Institute Pasteur, Paris, France
4. Targeting of Membrane and Secretory Proteins in Caco-2 Cells	Michael Rindler	Assistant Professor, Department of Cell Biology, New York University Medical College, New York, NY
Discussion	Mark Mooseker and Marion Neutra	Professor, Department of Biology, Yale University, New Haven CT (MM), and Children's Hospital and Harvard Medical School (MN), Boston MA

**Session IV. Development and Maintenance of Polarized Epithelial Cell Function****Michael Caplan Chair**

Topic	Speaker	Affiliation
A Brief Overview of the Problem	James Jamieson	Chair, Department of Cell Biology, Yale University School of Medicine, New Haven, CT
1. Sorting of Ion Pumps in Polarized Epithelial Cells.	Michael Caplan	Assistant Professor, Department of Physiology, Yale University School of Medicine, New Haven, CT
2. Cytoskeletal-Membrane Interactions in Enterocyte Function	Mark Mooseker	Professor, Department of Biology, Yale University, New Haven, CT
3. Assembly of Tight Junctions in Developing Gut	James M. Anderson	Assistant Professor, Department of Medicine, Yale University School of Medicine, New Haven, CT
4. Targeting of IgA in Polarized Epithelial Cells	Keith Mostov	Assistant Professor, Department of Biochemistry, University of California Medical School, San Francisco, CA.

**Session V. Endocytosis and Transcytosis in Mucosal Immunity****Marion Neutra Chair**

Topic	Speaker	Affiliation
A Brief Overview of the Problem	Marion Neutra	Professor of Pediatrics, Children's Hospital and Harvard Medical School (MN), Boston MA
1. Transepithelial transport of antigens in the intestine	Marion Neutra	see above
2. Endocytosis and Transcytosis of Antibodies in the Developing Gut	Richard D. Rodewald	Associate Professor, Department of Biology, University of Virginia, Charlottesville, VA
3. Cytokine Production and Function of Intra-Epithelial Lymphocytes	Jerry R. McGhee	Professor, Department of Microbiology, University of Alabama, Birmingham Alabama
4. Transepithelial Transport and Function of Secretory IgA in the Bowel	Jean-Pierre Krahenbuhl	Swiss Institute for Experimental Cancer Research, University of Lausanne, Lausanne, Switzerland

Discussion	D. W. Powell and G. A. Castro	Professor of Medicine, University of North Carolina School of Medicine, Chapel Hill NC (D.W.P.) and Professor of Physiology and Cell Biology, University of Texas Medical School, Houston TX (G.A.C.)
------------	----------------------------------	---

**Session VI. Extracellular Modulation of GI Cell Differentiation****James Jamieson Chair**

Topic	Speaker	Affiliation
A Brief Overview of the Problem	James Jamieson	Chair, Dept. of Cell Biology, Yale University College of Medicine, New Haven, CT
1. Extracellular Matrix-Plasma Membrane Transduction by Integral Membrane Proteoglycans	Merton Bernfield	Professor, Joint Program in Neonatology, Harvard Medical School, Boston, MA
2. Integrins: Cell-Specific Extracellular Matrix Receptors	Vito Quaranta	Associate Professor, Department of Immunology, Research Institute Scripps Clinic, LaJolla, CA
3. Epithelial-Mesenchymal Interactions and Cell Differentiation	Peter Ekblom	Doctor of Medicine, Max Planck Institute, Tubingen, Federal Republic of Germany
4. Proteoglycan/Hormonal Signaling of Tissue-Specific Genes in Liver Cell Lineages: The Chaperone Model	Lola Reid	Professor, Departments of Molecular Pharmacology and Microbiology & Immunology, Albert Einstein College of Medicine, New York NY
Discussion	Lewis Reichardt	Howard Hughes Medical Institute, and Department of Physiology, University of California San Francisco School of Medicine, San Francisco, CA

**Session VII. Cell Migration and Repair of the Epithelium****James L. Madara Chair**

Topic	Speaker	Affiliation
1. Rapid Repair of Intestinal Epithelia: An Overview	James L. Madara	Associate Professor of Pathology, Harvard Medical School, Boston MA
2. Regulation of Contractility in Fibroblasts	Lancing Taylor	Professor, Dept. of Biological Science, Carnegie-Mellon University, Pittsburgh, PA
3. Mechanism and Regulation of Cell-Substratum Adhesion	Mary Beckerle	Assistant Professor of Biology, University of Utah, Salt Lake City, UT

4. Differential Expression of Non-Integrin Laminin Binding Proteins	Mark Sobel	Senior Research Investigator, National Cancer Institute, NIH, Bethesda, MD
Discussion	Lewis Reichardt and Vito Quaranta	Howard Hughes Medical Institute, and Department of Physiology, University of California San Francisco School of Medicine, San Francisco, CA (LR) and Associate Professor, Department of Immunology, Research Institute Scripps Clinic, LaJolla, CA (VQ)

**Session VIII. The Neural Crest and GI Development****Michael Gershon Chair**

Topic	Speaker	Affiliation
1. Cell Lineages in the Development of Cells From the Neural Crest	Nicole Le Douarin	Professor of the Collège de France and Director of the Institute de L'Embryologie of the Collège de France and of the CNRS, Nogent Sur Marne, France
2. Extracellular Matrix and Neural Development	Louis Reichardt	Howard Hughes Medical Institute, and Department of Physiology, University of California San Francisco School of Medicine, San Francisco, CA
3. Cell interactions in neural crest cell migration	Marianne Bronner-Fraser	Associate Professor, Developmental Biology Center, University of California, Irvine, CA
4. Extracellular matrix and Cell Lineages in the Development of the Enteric Nervous System: Origin of Congenital GI Neuromuscular Abnormalities	Michael D. Gershon	Professor and Chair, Dept. of Anatomy and Cell Biology, Columbia Univ. P & S, New York, NY.
Discussion	Taube P. Rothman	Research Scientist, Dept. of Anatomy and Cell Biology, Columbia Univ. P & S, New York, NY.

**Session IX. Intestinal Inflammation/Anaphylaxis and Neural Function****Don W. Powell**

Topic	Speaker	Affiliation
1. Overview: Inflammation-Induced Intestinal Secretion	Don W. Powell	Professor and Assoc. Chair, Dept. of Medicine, University of North Carolina School of Medicine, Chapel Hill, NC

Discussant	Kim E. Barrett	Assistant Prof. of Medicine, Dept. of Medicine, University of California San Diego School of Medicine San Diego CA
2. Antigen-Induced Intestinal Secretion	Mary H. Perdue	Associate Professor, Dept. of Pathology, McMaster University, West Hamilton, Ontario, Canada
Discussant	Gilbert A. Castro	Professor, Department of Physiology and Cell Biology, University of Texas Medical School, Houston, TX
3. Inflammatory Mediators and Nerve Function	Jackie D. Wood	Professor and Chair, Department of Physiology, Ohio State University College of Medicine, Columbus, OH
Discussant	Helen J. Cooke	Professor, Department of Physiology, Ohio State University College of Medicine, Columbus, OH
4. Receptor-Response Coupling and Enteric Nerves	Alan R. North	Senior Scientist, Vollum Institute, Professor of Neurology, Oregon Health Science University, Portland, OR.
Discussant	Annmarie Surprenant	Associate Professor, Dept. of Physiology, Vollum Institute, Oregon Health Science University, Portland, OR.

## XI. EVALUATION OF THE CONFERENCE

The degree of success in achieving the objectives of the conference will be evaluated in a report submitted to the FASEB general office by the chairman of the organizing committee and by a questionnaire distributed to each of the participants. The report will be based on a consensus of opinion of the organizers of each session as to the strengths and weaknesses of the conference, in general, and extent to which will be included in the packet of conference materials, will provide feedback on the individual participant's views of the specifics of the conference. A copy of the questionnaire that will be used for this purpose is attached.